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| 09/424,684 | 11/29/1999 | KIYOFUMI INANAGA | 7246/57889 | 8380 |

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| EXAMINER | |
|---|---|
| FAULK, DEVONA E | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2615 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/424,684 | INANAGA ET AL. | |
| | Examiner | Art Unit | |
| | Devona E. Faulk | 2615 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *23 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 November 1998* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

***Response to Arguments***

1. Applicant's arguments, filed 6/14/2007, with respect to the rejection(s) of claim(s) 1,2 and 8 under 103(a) have been fully considered and are persuasive regarding prior art Sotome. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Mouri.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1,2** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mouri (US 5,799,094) in further view of Matsuo (US 6,553,121).

Regarding **claim 1**, Mouri discloses an audio reproducing apparatus Figure 1), comprising:

A distribution circuit (22a-22d; Figure 4) receiving input audio signals of N channels including at least front and back left channel directional components, front and back right channel directional components (Figure L,R,SL,SR), and a sound filed image signal (C , figure 1);

said distribution circuit processing said sound field image signal to produce at least two processed signals which are added to at least some of said input audio signals, whereby said distributing circuit generates audio signals of N-1 channels that represent the positions of sound images at least corresponding to the front and back left

channel directional components and the front and back right channel directional components as sound image components (Figure 4; the center channel C is processed with attenuator 22b to produce at least two processed signals which are added to the left and right signals; the N-1 channels that are produced are the Lch and Rch output from 22a and the outputs of 22c and 22d);

a first signal processing circuit for processing audio signals of N-1 channels output from the distributing circuit on each channel so as to produce output audio signals having an equivalent sound field of M (where M < N-1) electrical-acoustic converting units (adders 22e and 22f reads on a first signal processing circuit because it processes the Lch and Rch output from 22a and the outputs of 22c and 22d).

Mouri fails to disclose a second signal processing circuit for receiving the audio signals from a first signal processing circuit and equivalently processing the audio signals corresponding to transfer functions from the M electric –acoustic converting units to both ears of the listener. Matsuo discloses in Figure 2 an apparatus comprising a sound processing unit (transfer functions 11-14) and transfer 15 and 16 for generating a sound image which is localized outside the head of the user wearing the headphones (Figure 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Mouri with the teaching of Sotome and Matsuo for the purpose of providing a three-dimensional sound field to a headphone user.

Regarding **claim 2**, Mouri discloses an audio reproducing apparatus Figure 1), comprising:

A distribution circuit (22a-22d; Figure 4) receiving input audio signals of N channels including at least front and back left channel directional components, front and back right channel directional components (Figure L,R,SL,SR), and a sound filed image signal (C or center channel , figure 1);

the distribution circuit the distributing circuit includes a variable attenuating circuit receiving the sound field image signal, whereby varying amounts of the sound field image signal are added to at least some of the audio signals of N channels; said distributing circuit outputting signals that represent positions of the sound images of N-1 channels ( attenuator 22bFigure 4; the center channel C is processed with attenuator 22b to produce at least two processed signals which are added to the left and right signals; the distribution circuit outputs audio signals that represent positions of the sound images of N-1 channels because the distributing circuit outputs a Lch and Rch output from 22a and the outputs of 22c and 22d);

a first signal processing circuit for processing audio signals of N-1 channels output from the distributing circuit on each channel so as to produce output audio signals having an equivalent sound field of M (where M < N-1) electrical-acoustic converting units (adders 22e and 22f reads on a first signal processing circuit because it processes the Lch and Rch output from 22a and the outputs of 22c and 22d).

Mouri fails to disclose a second signal processing circuit for receiving the audio signals from a first signal processing circuit and equivalently processing the audio signals corresponding to transfer functions from the M electric –acoustic converting units to both ears of the listener. Matsuo discloses in Figure 2 an apparatus comprising

a sound processing unit (transfer functions 11-14) and transfer 15 and 16 for generating a sound image which is localized outside the head of the user wearing the headphones (Figure 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Mouri with the teaching of Sotome and Matsuo for the purpose of providing a three-dimensional sound field to a headphone user.

4. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Mouri (US 5,799,094) in view of Matsuo (US 6,553,121) in further view of McGrath (US 6,259,795).

Regarding **claim 8**, Mouri as modified by Matsuo discloses an output means for supplying the output audio signals of the first signal processing circuit to an outside of the apparatus. Mouri as modified by Matsuo fail to disclose a detecting means for detecting a motion of the head of the listener and controlling means for controlling the signal processing corresponding to the detecting means and wirelessly supplying the output signals. McGrath discloses a detecting means for detecting a motion of the head of the listener and controlling means for controlling the signal processing corresponding to the detecting means (Figure 1; column 5, line 52-column 6, line 11). It would have been obvious to modify the Mouri as modified by Sotome and Matsuo to include the head tracking apparatus of McGrath for the purpose of improving the realism of listening to audio with headphones.

Regarding wirelessly supplying the output signals, the examiner takes official notice that using wireless transmission is known in the art and it would have been obvious to use wirelessly provide the output to the electric-acoustic converting units for the benefit of allowing increased mobility for the user.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 571-272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848.

The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2615.The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Devona E. Faulk

/Devona E. Faulk/
Examiner
Art Unit 2615
2/29/2008